



# Guidance on fire safety Performance Solutions

**This guide has been produced to inform building surveyors, fire engineers, designers and others involved in developing and approving Performance Solutions relating to fire safety, of the practice that is expected by the Building Commissioner when developing fire safety Performance Solutions in Western Australia.**

It also provides the basis of a Code of Practice for those involved in developing and approving performance fire safety solutions and is used as a benchmark when auditing registered building service practitioners and contractors.

The information is current at the time of publication; however it may be subject to change.

## Introduction

Building solutions will comply with the [Building Code of Australia \(BCA\)](#) if it can be demonstrated that the relevant Performance Requirements have been met. Compliance with the Performance Requirements can only be satisfied by a:

- (a) Performance Solution; or
- (b) Deemed-to-Satisfy Solution; or
- (c) combination of (a) and (b).

While the Deemed-to-Satisfy Provisions often provide a ready-made building solution with certainty of compliance, they may not always be cost effective or appropriate for every circumstance. The Performance Solution option allows flexibility and innovation in design. Performance Solutions are commonly used for the fire safety provisions of the BCA and involve fire engineering.

While this guide specifically relates to fire safety Performance Solutions, the principles may apply to other types of Performance Solutions – with the necessary modifications.

Developing a fire safety Performance Solution is often complex and requires stakeholder input. This adds time to the overall project schedule, so it is important to consider Performance Solutions early in the design and not as a last minute fix to poor design or construction. Furthermore a Performance Solution isn't a mechanism for accepting non-compliance with building standards but a pathway for demonstrating compliance with the Performance Requirements of the BCA.

The table at Appendix A gives a general overview of the fire engineering process stages and responsibilities when considering fire safety Performance Solutions.

**The following key areas of developing and approving a fire engineered Performance Solution are covered in this guide:**

1. Performance Solutions.
2. Qualifications of fire engineers and building surveyors.
3. Fire engineering brief (FEB).
4. Relevant stakeholders.
5. Fire safety engineering report.
6. Interface with relevant building services.
7. Department of Fire and Emergency Services (DFES) interaction.
8. Peer review.
9. Certification independence.
10. Certificate of design compliance.
11. Owner's responsibility.
12. Site completion.

**Appendix A: Fire engineering process overview flow chart.**

Note: This document was originally published in November 2015. It has been updated and republished to reflect the change in BCA 2016 terminology from Alternative Solution to Performance Solution and includes some minor editorial changes.

**Disclaimer:**

The material contained in this document provides general guidance and information only and is current at time of publication. Readers should not act or omit to act solely on the basis of anything contained herein. In relation to a particular matter, you should seek appropriate professional advice. The State of Western Australia and its servants and agents expressly disclaim liability, whether in negligence or otherwise, for any act or omission resulting from reliance on this document or for any consequence of such act or omission.

## 1. Performance Solutions

Performance Solution is defined in the BCA as a method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.

A Performance Solution must:

- (a) comply with the Performance Requirements; or
  - (b) be at least equivalent to the Deemed-to-Satisfy Provisions,
- and be assessed according to one or more of the Assessment Methods.

A Performance Solution will only comply with the BCA when the Assessment Methods used satisfactorily demonstrate compliance with the Performance Requirements.

It is important that the person developing the Performance Solution understands the BCA requirements and intent. This knowledge and understanding is generally obtained from relevant skills, qualifications and experience. The onus is on the professional(s) carrying out the Performance Solution to provide sufficient documentation, evidence and validation to the certifying building surveyor that the solution complies with the relevant performance requirements. However it is important to involve the building surveyor early in the design stage as they can provide valuable guidance and interpretation on the BCA for the specific project.

Where the Performance Solution involves a specialist design, such as for fire safety, the use of a suitably qualified person, such as a fire engineer in the case of fire safety, is necessary. Nevertheless, the building surveyor is responsible for approving Performance Solutions i.e. compliance with the Performance Requirements of the BCA when signing the certificate of design compliance.

Building surveyors should fully document decisions made under the BCA and retain copies of all relevant documentation in accordance with the Documentation of Decisions section of the BCA.

For Performance Solutions this includes:

- details of the relevant Performance Requirements; and
- the Assessment Method or methods used to establish compliance with the relevant Performance Requirements; and
- details of any Expert Judgement relied upon including the extent to which the judgement was relied upon and the qualifications and experience of the expert. Expert Judgement should be justified and the logic used in applying it explained; and
- details of any tests or calculations used to determine compliance with the relevant Performance Requirements; and
- details of any Standards or other information that were relied upon.

The Australian Building Codes Board (ABCB) has published a guidance document on the "[Development of Performance Based Design Solution](#)" which further facilitates the development of performance based design using Performance Solutions.

## 2. Qualifications of fire engineers and building surveyors

Western Australia does not currently have a requirement for registered fire engineers. However it is expected that fire safety Performance Solution designs are carried out by fire engineers with sufficient skills, qualifications and experience for the specific project. This is similar to structural engineering being carried out by a suitably qualified and experienced structural engineer.

Fire engineering may include qualifications such as an undergraduate degree in Fire Safety Engineering, a post graduate qualification in fire engineering and may also include registration with a relevant association such as the National Engineering Register, or being a registered fire engineer for the purposes of Building Code compliance in another State.

The registered building surveyor signing the certificate of design compliance is ultimately responsible for the adequacy of any Performance Solution and needs to be satisfied that the person carrying out the Performance Solution has the appropriate competency for the proposed building type and complexity. It is recommended that, where necessary, further information on the fire engineer's qualifications and experience is requested to determine whether or not their competency and credentials are suited to the proposed project.

Complex Performance Solutions may require an engineer who has advanced qualifications and appropriate experience relevant to the type of Performance Solution proposed and/or involve the input of other specialists such as mechanical, electrical, structural and hydraulic engineers for example.

It is also expected that the building surveyor responsible for the project has the relevant competency appropriate to the complexity of the building solution. It should be noted that registration as a Level 1 or Level 2 building surveyor alone does not necessarily mean the building surveyor has the relevant qualifications or experience to evaluate and assess the building surveying components of a Performance Solution.

For a building involving complex fire engineering the building surveyor should have additional qualifications and sufficient experience in fire safety or be relying on advice from another building surveyor that has the necessary qualification and experience.

Building surveyors should be scrutinising fire engineering designs and in particular the fire engineering briefs in detail and must be in a position to fully understand what has been proposed or designed before contemplating to sign a certificate of design compliance. It is not acceptable for a building surveyor to be reliant on a fire engineer to develop a fire engineering brief and report in isolation.

### 3. Fire engineering brief (FEB)

The development of a fire engineering brief is fundamental and forms the basis of the fire engineering process.

All fire safety Performance Solutions should be developed in accordance with the recommendations in the [International Fire Engineering Guidelines \(IFEG\) Edition 2005](#). In all cases a fire engineering brief (FEB), in an appropriate format, will be required prior to preparation of the final fire safety engineering report and the process for this is explained in IFEG.

A fire engineering brief is defined in the IFEG as:

“A documented process that defines the scope of work for the fire engineering analysis and the basis for analysis as agreed by stakeholders.”

Unlike the other established engineering disciplines, such as structural engineering, where the scope of the work and the structural analysis is fully covered by Deemed-to-Satisfy standards, fire engineering requires the scope and inputs to the engineering analysis to be defined and agreed upfront.

Fire can be very unpredictable and it may not be feasible to evaluate every possible scenario. The FEB is the process for the building surveyor and fire engineer, together with other relevant stakeholders, to identify the most significant hazards and most likely scenarios in order to establish, quantify and set the design parameters.

The way a FEB is documented has to be determined on a case by case basis depending on the complexity and details of the Performance Solution. For a simple case it may be in the form of an email to set out the Deemed-to-Satisfy non compliances; identify the relevant Performance Requirements and summarise design discussions between the relevant stakeholders.

However for a more complex Performance Solution the FEB may need to be in the form of a report and may involve several revisions following comment by the relevant stakeholders. In either case the FEB should be consistent with the IFEG.

### 4. Relevant stakeholders

The relevant stakeholders required for the design of the Performance Solution will vary for every project. The Building Commissioner expects building surveyors and fire engineers to be following the guidelines in the IFEG which includes the following stakeholders:

- Client or client's representative (such as a project manager).
- Fire engineer.
- Registered building surveyor.
- Architect or designer.
- Department of Fire and Emergency Services.

More complex projects may require various specialist consultants such as hydraulic; mechanical; structural or electrical engineers. It may also include tenants; building operations management; insurance company representative and the permit authority.

## 5. Fire safety engineering report

As outlined in IFEG the fire engineering process typically goes through five stages:

- Prepare FEB.
- Carry out analysis.
- Collate and evaluate results.
- Draw conclusions.
- Prepare report.

Carrying out these five stages is of little use unless it is reported in a transparent manner that is responsible, accurate and aimed at helping the ultimate decision maker (i.e. the building surveyor), is useful to the builder for construction, and the owner and permit authority for any future compliance purposes. This process is outlined in Chapter 1.11 of IFEG.

As part of the fire safety engineering report (FSER), the fire engineer goes through the process of carrying out analysis, modelling or testing, then collates and evaluates the results to ascertain if the agreed acceptance criteria in the FEB have been met. This process may need to be repeated until results can draw to a conclusion on satisfying the agreed acceptance criteria and compliance with the relevant Performance Requirements of the BCA to form part of the final report.

The FSER should include the content and be laid out in the manner identified in Chapter 1.11 of IFEG. Section 1.11.2 of the chapter provides the following content headings:

- Report identification.
- Executive summary.
- Introduction.
- Fire engineering brief.
- Analysis.
- Collation and evaluation of results.
- Conclusions.
- References.
- Drawings and technical data identification.

## 6. Interface with relevant building services

Some Performance Solutions may have an impact on the design of other services or building elements. For example, an enhanced smoke management system may be proposed that relies on the operation of the smoke exhaust system at a specific rate on activation of particular detectors (not all smoke detectors). In this case, the mechanical engineer will need to design the exhaust system to achieve the rate specified; and the electrical/fire services consultant will need to ensure that the smoke exhaust system operates as required on activation of the particular smoke detector/s in accordance with requirements of the fire engineering report.

The building surveyor must work with the fire safety engineer to ensure that the designs provided by the various consultants are in accordance with the FSER. Ultimately the building surveyor must be satisfied that the correct interface activities have occurred prior to signing and issuing the certificate of design compliance. This includes the correct information being relayed in the technical plans and specifications of the relevant engineering/consultant documentation. These aspects will also need to be checked at construction completion and may require further inspection, testing and certification at other landmark stages.

## 7. Department of Fire and Emergency Services (DFES) interaction

DFES does not have an approval role for building standards under building legislation. However, DFES provides valuable advice on ensuring the Fire and Emergency Services (FES) Commissioner's operational requirements are met in the interests of fire fighters and the public. DFES is an integral part of the stakeholder group on the development of the FEB and FSER and should be consulted from the early stages particularly when developing the FEB.

The Built Environment Branch of DFES can be contacted for further information on DFES interaction in the fire engineering process.

The Building Regulations 2012 (the Building Regulations) requires the building surveyor to provide to the FES Commissioner plans and specifications, in sufficient detail to allow assessment of compliance with the FES Commissioner's operational requirements, at least 15 business days before signing a certificate of design compliance in respect of certain Class 2 to Class 9 buildings. This requirement is separate to DFES involvement as a stakeholder in developing a Performance Solution in accordance with the IFEG.

Ultimately, the building surveyor has the authority to certify compliance with applicable building standards that include the Performance Requirements of the BCA. The building surveyor can decide not to take the advice of the FES Commissioner particularly where the advice does not relate to compliance with the BCA. However, the building surveyor may wish to liaise with the owner and DFES over the FES Commissioner's advice on operational requirements to mitigate any risk of facing enforcement action under the separate legislation administered by DFES.

There is a further requirement for the building surveyor to notify the FES Commissioner of any advice provided by the FES Commissioner that will not be included in the building design, and the reasons for not taking the advice provided, within 10 days of receiving the advice. While a building surveyor may confer with an expert on the matters raised by DFES, ultimately the building surveyor makes the decision to accept or reject the advice. It must be clear in the response to the FES Commissioner that the reasons for not taking the advice have been carefully considered and are those asserted and determined by the building surveyor and not another person.

DFES have forms on their website [www.dfes.wa.gov.au](http://www.dfes.wa.gov.au) for the purpose of submitting plans and specifications to the FES Commissioner.

## 8. Peer review

A peer review may be considered where a significant level of risk associated with the Performance Solution may be conceived, the solution involves several complex and possibly compounding building solutions, or where justification is required on Expert Judgement. In general the building surveyor, design team or stakeholder consensus may dictate if a peer review is required. However, given that ultimately the certifying building surveyor is taking responsibility for the Performance Solution, the building surveyor needs to decide if the circumstances warrant the need for a peer review.

Separate to any peer review, the building surveyor should confirm that the fire engineering design has undergone an appropriate quality assurance process. This may include that reports and calculations have been checked and approved by a competent person other than the author.

A peer review should be a constructive process to assist in the approval of fire safety Performance Solutions and not be a critique of fault finding and negative judgement. The person carrying out any peer review must have at least equivalent competencies and experience to the person carrying out the fire engineering.

## 9. Certification independence

Section 4 of the *Building Act 2011* (the Building Act) refers to an independent building surveyor. An independent building surveyor cannot be the owner or builder or be an employee of the owner or builder. Other than the restriction under section 4, there is nothing in the Building Act to prevent a registered building surveyor from participating in the design or development of a Performance Solution for a project they are certifying. The registered building surveyor signing a certificate of design compliance must be satisfied that any proposed building complies with the applicable building standards.

A registered building surveyor, when signing such certificates, should be cognisant of his or her level of competence and expertise and must not under any circumstances sign a compliance certificate if there is any uncertainty on the compliance with the applicable building standards. Under the *Building Services (Registration) Act 2011*, a registered building surveyor can face disciplinary action if found to be negligent or incompetent in connection with carrying out a building service.

Determining compliance with Performance Solutions can be particularly complex and in most cases will require extensive input from persons with expertise beyond that of a competent registered building surveyor. The usual skills and training provided as part of building surveying qualifications does not provide sufficient detail in the competencies required for carrying out engineering analysis and reporting.

## 10. Certificate of design compliance

In relation to what must be included in the certificate of design compliance Regulation 18A(c) of the Building Regulations states that:

*“if the certificate of design compliance is in respect of a Class 2 to Class 9 building or an incidental structure associated with such a building, a statement about each Performance Solution to a building standard that applies to the building work and details of the assessment methods used to establish compliance with the building standard;”*

This provision is satisfied if the certificate of design compliance, in relation to a performance fire safety building solution, includes the fire engineering report prepared in accordance with the guidance provided in the IFEG and a reference to that report is made in the certificate of design compliance. The report should set out how the Performance Solution has been determined in accordance with Part A0 of the BCA. This includes identification of the relevant Deemed-to-Satisfy Provisions; relevant Performance Requirements and Assessment Methods.

Where a Performance Solution is in place in an existing building, and new works are proposed, any effect on the existing Performance Solution must be considered and noted on the certificate of design compliance for the new building works. The impact of proposed works to a building with existing Performance Solutions may not be clearly apparent and therefore may require consultation with the fire engineer.

For all buildings, including Class 1 and Class 10 buildings, the application for a building permit must include details of each Performance Solution.

A certificate of design compliance must be in an approved form and must contain a statement, by the building surveyor signing the certificate, that if the building is completed in accordance with the plans and specifications that are specified in the certificate, the building will comply with each applicable standard (namely the BCA). Accordingly the plans and specifications should be sufficient in detail to clearly show how the building will be constructed to comply with the BCA including any Performance Solutions.

## 11. Owner's responsibility

Performance Solutions will sometimes involve Management in Use requirements and usually will have maintenance requirements or include unusual design features that the building owner needs to be aware of and familiar with. The provisions within the Performance Solution should be practical and formally communicated to relevant persons such as building management, tenants and any future owners.

An owner's acknowledgement letter regarding any Management in Use provisions in the fire engineering report should be required prior to the signing or issuing of the certificate of design compliance. It is worth noting that fire engineered Performance Solutions result in complex interactions between different systems and with increasingly sophisticated protection systems, may be confusing with regard to the management of the building in the long term. The fire engineering design must consider management and maintenance practicalities in the design.

A Performance Solution may be attractive in providing cost savings at the design stage but may be more costly and less economical in the long term if the maintenance requirements are overly complicated.

The Performance Solution should consider future impact on owners.

While there is no reporting mechanism for the maintenance of safety systems, Regulation 48A of the Building Regulations contains requirements for the owner of a Class 2 to Class 9 building to ensure safety measures perform to a standard not less than they were originally required to achieve. The owner should have operational manuals and appropriate documentation in order to meet their obligation for maintenance.

## 12. Site completion

On completion, a builder is required to submit a notice of completion to the permit authority along with test certificates for the mandatory tests listed in Schedule 3 of the Building Regulations relating to fire safety performance requirements. The permit authority must set out in the building permit each of these inspections and tests, including those that may form part of the FSER.

The process of applying for an occupancy permit is separate to the builder's notice of completion. The determination on compliance and issuing of any certification by the building surveyor must be independent to the builder. The building surveyor should carry out the necessary inspections; witness any relevant tests; and collate relevant construction documentation in order to be satisfied that the building work has been completed in accordance with all the relevant plans and specifications, including the fire engineering report, before signing the certificate of construction compliance.

The fire engineer may also be required to carry out site inspections; witness tests/commissioning; and collate relevant certification from sub-contractors to confirm that works have been completed in accordance with the approved FSER. It is up to the building surveyor to insist on such inspections by the fire engineer if they are necessary for the building surveyor to be able to sign and issue the certificate of construction compliance. Regulation 35 of the Building Regulations contains the requirement to clearly display the occupancy permit at or near the principal entrance of the building or related part of the building.

A condition on the occupancy permit will assist building occupants on any Management in Use requirements associated with the fire engineered Performance Solution for the building. This may include reference to the FSER and possibly a summary of the Performance Solutions. The permit authority may determine any relevant conditions to place in an occupancy permit with assistance from the certifying building surveyor to correctly document conditions relating to Performance Solutions.

## Appendix A: Fire engineering process - stages and responsibilities overview

DESIGN		
<p>Building surveyor:</p> <ul style="list-style-type: none"> <li>Identifies areas of non-compliance to Deemed-to-Satisfy Provisions of the Building Code of Australia (BCA).</li> <li>Before any fire engineering starts identifies and agrees on performance design philosophies in principle.</li> <li>Approves the fire engineering brief (FEB) to enable fire safety engineering report (FSER).</li> <li>Reviews and provides comment on fire engineering proposals in context with the BCA performance requirements.</li> </ul>	<p>Fire engineer: Develops fire engineering brief with stakeholder input and then the (FSER)</p>	<p>Design team (e.g. architect, services consultants, fire engineer and building surveyor): Relevant liaison occurs with the Built Environment Branch of the Department of Fire and Emergency Services (DFES) and other stakeholders on the FEB and fire engineering throughout the design process.</p>
DESIGN APPROVAL		
<p>Building surveyor: Completes a certificate of design compliance (CDC) when satisfied the fire safety Performance Solution, along with overall building proposals, comply with the Performance Requirements of the BCA.</p> <p>Note: For all Class 2 to Class 9 buildings involving Performance Solutions relating to fire safety, the building surveyor must provide plans and specifications to the FES Commissioner at least 15 business days before signing the CDC. Any advice from the FES Commissioner and any reasons for not incorporating that advice must be noted on the CDC.</p>	<p>Fire engineer: Provides final FSER confirming the acceptance criteria in the FEB have been met.</p>	<p>Design team: To ensure final documentation is consistent with fire engineering report for providing to the building surveyor for the certificate of design compliance.</p> <p>May assist the building surveyor in providing any further comment on FES Commissioner advice.</p>
CONSTRUCTION		
<p>Building surveyor: May carry out inspections to ensure compliance with plans and specifications including that the fire engineered solutions specified in the relevant CDC are being achieved during the construction stage.</p>	<p>Fire engineer: May inspect site during construction and provide advice on the fire engineering report during construction.</p>	<p>Builder: to ensure construction is being carried out in accordance with the plans and specifications, including fire engineered solutions specified in the relevant CDC.</p>
COMPLETION		
<p>Building surveyor: Must be satisfied the building has been completed in accordance with the plans and specifications including fire engineering report specified in the relevant CDC prior to signing a certificate of construction compliance for the building owner or occupier to obtain an occupancy permit when one is required.</p>	<p>Fire engineer: Generally inspects and gathers relevant information to confirm requirements of fire engineering report have been met.</p>	<p>Builder: must submit a notice of completion with relevant test certificates.</p> <p>Owner has responsibility over maintenance of the building's safety measures including any requirements in the FSER.</p>

Department of **Mines, Industry Regulation and Safety**

**Building and Energy Division**

**1300 489 099**

Level 1 Mason Bird Building  
 303 Sevenoaks Street (entrance Grose Avenue)  
 Cannington Western Australia 6107  
 Plumbers general enquiries: 08 6251 1377  
 Subcontractor Payment Disputes: 1300 484 481  
 Website: [www.dmirs.wa.gov.au](http://www.dmirs.wa.gov.au)  
 Email: [bcinfo@dmirs.wa.gov.au](mailto:bcinfo@dmirs.wa.gov.au)

**Regional Offices**

Goldfields/Esperance	(08) 9026 3250
Great Southern	(08) 9842 8366
Kimberley	(08) 9191 8400
Mid-West	(08) 9920 9800
North-West	(08) 9185 0900
South-West	(08) 9722 2888

**National Relay Service: 13 36 77**

**Quality of service feedback line: 1800 304 059**

**Translating and Interpreting Service (TIS) 13 14 50**

**This publication is available in other formats on request to assist people with special needs.**